

--31. (New) A method of producing photochromic latex comprising a stabilizing agent comprising:

obtaining an aqueous emulsion of a polymerizable mixture comprising a weight of one or more organic monomers containing C=C groups that are polymerizable by a free-radical mechanism and one or more photochromic compounds;

polymerizing the polymerization mixture to form a latex;

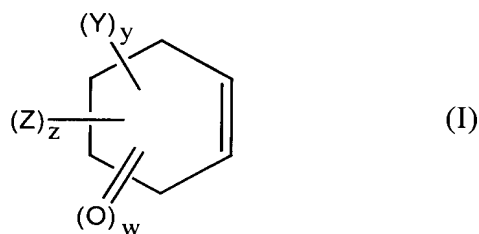
obtaining a composition comprising a weight of least one stabilization agent capable of stabilizing photochromic properties selected from the group consisting of cyclopentene compounds, cyclohexene compounds, cycloheptene compounds, cyclooctene compounds, and compounds comprising an ethylenic unsaturation not forming part of an aromatic ring and a carbon atom bearing a free hydroxy group, wherein the carbon atom is in the α position with respect to the ethylenic unsaturation; and

adding the composition comprising the stabilization agent to the polymerization mixture prior to or during polymerization of the polymerizable mixture or to the latex after polymerization;

wherein photochromic latex comprising a stabilizing agent is produced.

32. (New) The method of claim 31, wherein the stabilization agent is a cyclohexene compound.

33. (New) The method of claim 32, wherein the cyclohexene compound has the formula:



wherein:

any Y is, independently, an alkyl group of 1 to 4 carbon atoms;

any Z is a hydroxy group, a 2-oxoethyl group, a hydroxyalkyl group of 1 to 3 carbon atoms, an alkoxycarbonyl group of 2 to 5 carbon atoms, or a R'COOR" group

in which R' is an alkyl radical of 1 to 4 carbon atoms and R'' is an alkane di-yl radical of 2 to 4 carbon atoms or an alkylidene radical of 1 to 5 carbon atoms;
y is an integer from 0 to 3;
z is 0 or 1;
w is 0 or 1; and
the sum of z and w is 0 or 1.

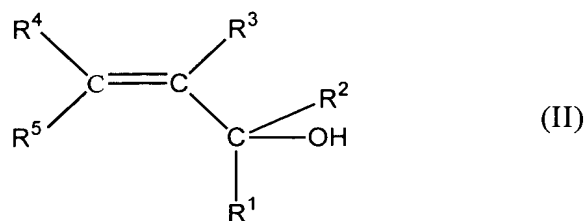
34. (New) The method of claim 33, wherein the cyclohexene compound is selected from the group consisting of cyclohexene, α -terpineol, terpinen-4-ol, α -terpinyl acetate, α -terpinyl propionate, α -terpinyl butyrate, 1-methyl-1-cyclohexene, 3-methyl-1-cyclohexene, 4-methyl-1-cyclohexene, methyl 1-cyclohexene-1-carboxylate, 3-methyl-2-cyclohexen-1-ol, 3-methyl-2-cyclohexen-1-one, 4-isopropyl-2-cyclohexen-1-one, 3,5-dimethyl-2-cyclohexen-1-one, 4,4-dimethyl-2-cyclohexen-1-one, isophorone, 2,6,6-trimethyl-1-cyclohexene-1-acetaldehyde, and 3,5,5-trimethyl-2-cyclohexen-1-ol.

35. (New) The method of claim 33, wherein the cyclohexene compound is cyclohexene.

36. (New) The method of claim 31, wherein the stabilization agent is a compound comprising:

an ethylenic unsaturation not forming part of an aromatic ring; and,
a carbon atom bonded to a free hydroxy group and at least one hydrogen atom,
wherein the carbon atom is in the α position with respect to the ethylenic unsaturation.

37. (New) The method of claim 36, wherein the stabilization agent has the formula:



wherein:

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R^1 and R^2 are both hydrogen; or one of R^1 and R^2 is hydrogen and the other forms, with the R^5 group, a C_5 - C_{10} ring, which may be substituted with one or more linear or branched C_1 - C_4 alkyl groups and/or one or more C_2 - C_4 alkylene groups; or one of R^1 and R^2 is hydrogen and the other is a C_1 - C_6 aliphatic alkyl group, a C_4 - C_{16} cyclic hydrocarbon group, or a C_6 - C_{16} aromatic hydrocarbon group;

R^3 , R^4 , and R^5 , independently, are: hydrogen; a C_1 - C_6 alkyl group which may be substituted with one or more OH groups and may be interrupted by one or more ether, ester or ketone groups; a C_6 - C_{16} aromatic hydrocarbon group; or a C_4 - C_{16} cyclic hydrocarbon group;

R^3 and R^4 may form a C_5 - C_{10} ring which may be substituted with one or more C_1 - C_4 alkyl groups or C_2 - C_4 alkylene groups; and

two or more carbon atoms of any C_5 - C_{10} ring formed with R^1 or R^2 and R^5 or with R^3 and R^4 may be bonded by a hydrocarbon bridge.

38. (New) The method of claim 37, wherein R^1 and R^2 represent hydrogen, R^3 represents a methyl group, R^4 represents hydrogen or a methyl group and R^5 represents hydrogen, a methyl, ethyl or CH_2OH group.

39. (New) The method of claim 37, wherein the compound of formula (II) is selected from the group consisting of allyl alcohol, methallyl alcohol, crotyl alcohol, 2-cyclohexen-1-ol, trans-2-hexen-1-ol, cis-2-butene-1,4-diol, 3-methyl-2-buten-1-ol, trans-2-methyl-3-phenyl-2-propen-1-ol, 3-buten-2-ol, carveol, myrtenol, verbenol and trans-cinnamyl alcohol.

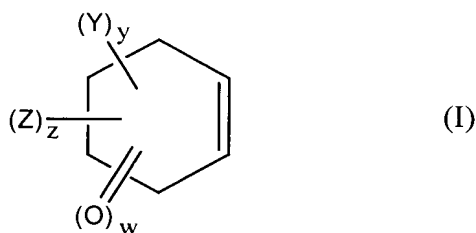
40. (New) The method of claim 39, wherein the compound of formula (II) is 3-methyl-2-buten-1-ol.

41. (New) The method of claim 31, wherein the weight of the at least one stabilization agent is 0.1 to 10% of the weight of the monomers in the polymerizable mixture.

42. (New) The method of claim 41, wherein the weight of the at least one stabilization agent is 1 to 10% of the weight of the monomers in the polymerizable mixture.

43. (New) The method of claim 42, wherein the weight of the at least one stabilization agent is about 5% of the weight of the monomers in the polymerizable mixture.
44. (New) The method of claim 31, wherein the aqueous emulsion of the polymerizable mixture is further defined as a mini-emulsion.
45. (New) The method of claim 31, wherein the monomers are selected from the group consisting of alkyl acrylates, alkyl methacrylates, and mixtures thereof.
46. (New) The method of claim 31, wherein the photochromic compound is selected from the group consisting of chromenes, spirooxazines and mixtures thereof.
47. (New) The method of claim 31, wherein the photochemical property stabilization agent is added to the polymerizable mixture during polymerization.
48. (New) The method of claim 31, wherein the photochemical property stabilization agent is added to the latex after polymerization.
49. (New) A stabilized photochromic latex comprising:
an aqueous dispersion of polymer particles resulting from the free-radical
polymerization of one or more organic monomers containing C=C groups;
one or more photochromic compounds; and;
an effective quantity of at least one stabilization agent capable of stabilizing
photochromic properties selected from the group consisting of cyclopentene
compounds, cyclohexene compounds, cycloheptene compounds, cyclooctene
compounds, and compounds comprising an ethylenic unsaturation not forming
part of an aromatic ring and a carbon atom bearing a free hydroxy group,
wherein the carbon atom is in the α position with respect to the ethylenic
unsaturation.
50. (New) The latex of claim 49, wherein the stabilization agent is a cyclohexene compound.

51. (New) The latex of claim 50, wherein the cyclohexene compound has the formula:



wherein:

any Y is, independently, an alkyl group of 1 to 4 carbon atoms;

any Z is a hydroxy group, a 2-oxoethyl group, a hydroxyalkyl group of 1 to 3 carbon atoms, an alkoxycarbonyl group of 2 to 5 carbon atoms, or a R'COOR'' group in which R' is an alkyl radical of 1 to 4 carbon atoms and R'' is an alkane di-yl radical of 2 to 4 carbon atoms or an alkylidene radical of 1 to 5 carbon atoms;

y is an integer from 0 to 3;

z is 0 or 1;

w is 0 or 1; and

the sum of z and w is 0 or 1.

52. (New) The latex of claim 51, wherein the cyclohexene compound is selected from the group consisting of cyclohexene, α -terpineol, terpinen-4-ol, α -terpinyl acetate, α -terpinyl propionate, α -terpinyl butyrate, 1-methyl-1-cyclohexene, 3-methyl-1-cyclohexene, 4-methyl-1-cyclohexene, methyl 1-cyclohexene-1-carboxylate, 3-methyl-2-cyclohexen-1-ol, 3-methyl-2-cyclohexen-1-one, 4-isopropyl-2-cyclohexen-1-one, 3,5-dimethyl-2-cyclohexen-1-one, 4,4-dimethyl-2-cyclohexen-1-one, isophorone, 2,6,6-trimethyl-1-cyclohexene-1-acetaldehyde, and 3,5,5-trimethyl-2-cyclohexen-1-ol.

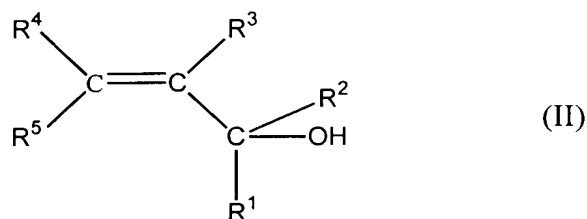
53. (New) The latex of claim 51, wherein the cyclohexene compound is cyclohexene.

54. (New) The latex of claim 50, wherein the stabilization agent is a compound comprising:

an ethylenic unsaturation not forming part of an aromatic ring; and

a carbon atom bonded to a free hydroxy group and at least one hydrogen atom,
wherein the carbon atom is in the α position with respect to the ethylenic unsaturation.

55. (New) The latex of claim 50, wherein the compounds with ethylenic unsaturation have the formula:



wherein:

R^1 and R^2 are both hydrogen; or one of R^1 and R^2 is hydrogen and the other forms, with the R^5 group, a C_5 - C_{10} ring, which may be substituted with one or more linear or branched C_1 - C_4 alkyl groups and/or one or more C_2 - C_4 alkylene groups; or one of R^1 and R^2 is hydrogen and the other is a C_1 - C_6 aliphatic alkyl group, a C_4 - C_{16} cyclic hydrocarbon group, or a C_6 - C_{16} aromatic hydrocarbon group;

R^3 , R^4 , and R^5 , independently, are: hydrogen; a C_1 - C_6 alkyl group which may be substituted with one or more OH groups and may be interrupted by one or more ether, ester or ketone groups; a C_6 - C_{16} aromatic hydrocarbon group; or a C_4 - C_{16} cyclic hydrocarbon group; and

R^3 and R^4 may form a C_5 - C_{10} ring which may be substituted with one or more C_1 - C_4 alkyl groups or C_2 - C_4 alkylene groups; and

two or more carbon atoms of any C_5 - C_{10} ring formed with R^1 or R^2 and R^5 or with R^3 and R^4 may be bonded by a hydrocarbon bridge.

56. (New) The latex of claim 55, wherein R^1 and R^2 represent hydrogen, R^3 represents a methyl group, R^4 represents hydrogen or a methyl group and R^5 represents hydrogen, a methyl, ethyl or CH_2OH group.

57. (New) The latex of claim 55, wherein the compound of formula (II) is selected from the group consisting of allyl alcohol, methallyl alcohol, crotyl alcohol, 2-cyclohexen-1-ol, trans-2-hexen-1-ol, cis-2-butene-1,4-diol, 3-methyl-2-buten-1-ol, trans-2-methyl-3-phenyl-2-propen-1-ol, 3-buten-2-ol, carveol, myrtenol, verbenol and trans-cinnamyl alcohol.

58. (New) The latex of claim 57, wherein the compound of formula (II) is 3-methyl-2-buten-1-ol.

59. (New) The latex of claim 49, further defined as comprising 0.1 to 10% by weight stabilization agent with respect to the weight of monomers in the initial mixture.

60. (New) The latex of claim 59, further defined as comprising 1 to 10% by weight stabilization agent with respect to the weight of monomers in the initial mixture.

61. (New) The latex of claim 60, further defined as comprising about 5% by weight stabilization agent with respect to the weight of monomers in the initial mixture.

62. (New) The latex of claim 49, wherein the polymer is an alkyl polyacrylate, an alkyl polymethacrylate, or a copolymer of alkyl acrylate and alkyl methacrylate.

63. (New) The latex of claim 49, wherein the photochromic compound is selected from the group consisting of chromenes, spirooxazines, and mixtures thereof.

64. (New) A substrate coated with a film formed by drying a stabilized photochromic latex comprising:

an aqueous dispersion of polymer particles resulting from the free-radical
polymerization of one or more organic monomers containing C=C groups;
one or more photochromic compounds; and;
an effective quantity of at least one stabilization agent capable of stabilizing
photochromic properties selected from the group consisting of cyclopentene
compounds, cyclohexene compounds, cycloheptene compounds, cyclooctene
compounds, and compounds comprising an ethylenic unsaturation not forming
part of an aromatic ring and a carbon atom bearing a free hydroxy group,